

Remarks

Claim 3 is cancelled and claims 1, 6 and 7 are amended. Claims 1, 2 and 4 to 14 are pending in this application of which claim 1 is in independent form and claims 4 and 5 are withdrawn.

Claims 1 to 3 and 6 to 12 were rejected under 35 USC 102(b) as being anticipated by Hisashi or, in the alternative, under 35 USC 103(a) as being obvious over Hisashi in view of Fujikawa.

The following will show that claim 1, as amended, patentably distinguishes the applicants' invention over these references.

Hisashi discloses a method for making a cylinder for an internal combustion engine. Here, a control window is machined with a work tool into the cylinder wall of the cast cylinder blank. The control window is machined as an opening of a control channel into the interior space of the cylinder. The cylinder wall is machined with a T-type cutter and the flow channel, which lies hidden in the cylinder wall, is cleared by machining in the control window. The known method therefore does not disclose more than the first method step of the applicants' method, namely, the formation of a breakthrough in the cylinder wall with a chip-cutting tool having a rotating primary movement.

As noted in the action, the multi-step machining method of the invention distinguishes from the applied references by the second machining step wherein the breakthrough is widened with a second work tool to the wanted dimension of the control window. Amended claim 1 clearly emphasizes this distinction over the

applied references in that a second work tool is used which is different from the first rotating work tool, namely, with a second work tool having a linear primary movement. Thus, amended claim 1 now includes the feature and limitation of:

"a second step of widening said breakthrough to a wanted dimension of said control window utilizing a second work tool with a linear primary movement."

In this way, a large portion of the required material removal for cutting out the control window is carried out with a cost effective manufacturing method with a rotating primary movement and the remaining burrs are cleanly removed with a second work tool with a linear machining movement and the precise dimensions of the control window are formed.

The applicants' invention is a combination of two machining steps with a first rotating machining primary movement and thereafter, with a completion of the control window with a second linear primary machining movement. This combination according to the invention affords the advantage that for each flow channel, the required control window can be machined in at clearly reduced manufacturing costs compared to known methods. The method of Hisashi does not provide for a multi-step machining of the cast cylinder head; rather, this method is directed exclusively to the machining of the control window with a rotating work tool.

The applicants' second step utilizing the second work tool with a linear primary movement is not suggested in the secondary reference, Fujikawa. This is so because the known method is concerned not with the machining of cylinder walls but with the introduction of holes into a planar plate for accommodating fuel

valves. Here, a two-step machining method is suggested, namely, the formation of a hole in the plate having a first diameter and thereafter, a subsequent widening to the final hole diameter.

In the first machining step, the hole is pressed in with a linear movement and, in the second machining step, the preliminary hole is widened with a linear movement utilizing a press pin. However, this machining of a planar plate in a first linear work step by pushing through the plate and thereafter widening by means of a work tool, which is likewise linearly moved, has nothing to do with the procedure of the applicants' invention in the machining of a round cylinder wall. An artisan, who is concerned with the machining of the round cylinder wall for forming the control window in the manufacture of the cylinder head, would in no way seek a solution for the problem on which the applicants' invention is based in the state of the art concerned with introducing holes into planar plates. For this reason alone, Fujikawa cannot be brought into combination with the method for making cylinders as taught by Hisashi.

Even with a hypothetical combination of Hisashi and Fujikawa, our person of ordinary skill could not arrive at the combination of features of applicants' claim 1. The two-step of Fujikawa provides, in a first method step for machining a planar plate, a push through the plate followed by pressing through the plate in a second method step with a linear press pin movement. The hypothetical transfer of the known method of Fujikawa to the machining of cylinder walls would, in a first method step, be to break through the cylinder wall with a press pin and, in a second method step, to provide a widening with a press pin having a

slightly larger diameter. It would be apparent to our person of ordinary skill that it would be impossible to form control windows in a cylinder wall of a cast cylinder head with the procedure suggested in the action because of the usual and required thickness of the cylinder wall which could not be broken through with a press pin tool in the narrow interior space of the cylinder and certainly not with the required precision. This is achieved only with the method of the applicants' invention wherein the remaining burrs are removed after the previous machining step with a linear primary movement in the second method step.

Combining Hisashi and Fujikawa does not enable our person of ordinary skill to arrive at the features of the applicants' invention, namely, the machining in a first method step with a rotatably driven work tool and the widening in a second method step with a work tool with a linear primary movement. The applicants' method is not obvious from the combination of these two references because, as explained above, the transfer of the machining of a planar plate to the machining of the inner wall of a cylinder is in no way obvious to the person of ordinary skill. To the contrary, it is apparent to the artisan that the machining method for planar plates utilizing press pins is unsuitable for the machining of cylinder walls. Fujikawa provides no suggestion for transferring the procedure for machining planar plates to the machining of cylinder walls.

In view of the foregoing, applicants submit that claim 1, as amended, patentably distinguishes their invention over the combination of Hisashi and Fujikawa and should now be allowable.

The remaining claims 2 and 6 to 14 are all dependent from claim 1 so that they too should now be allowable.

Reconsideration of the application is earnestly solicited.

Respectfully submitted,



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